

## Abstract of the Disclosure

Techniques for making carbon fiber bicycle frames. The techniques include techniques for making  
5 a chain stay-seat stay structure that includes carbon fiber tubes that are differentially stiff and  
techniques for making carbon fiber lugs for the frames. One of the techniques for making the chain  
stay-seat stay structure includes a wish bone seat stay in which the root tube of the seat stay has an  
oval cross section, so that the root tube is stiffer in the horizontal direction than it is in the vertical  
direction. Another of the techniques is a dual seat stay chain stay-seat stay structure in which the  
10 tubes of the structure have lay-ups such that the tubes are stiffer when bent than when twisted.

The techniques for making carbon fiber lugs employ expandable elements enclosed in a mold. In  
one of the techniques, the mold is a captured silicon mold and when the lug is cured, the captured  
silicon expands and forces the carbon fibers and matrix making up the lug against the tubes joined  
15 by the lug. In another of the techniques, a syntactic foam is applied between layers of the carbon  
fibers. The foam expands when the lug is cured and forces the carbon fibers and matrix against  
both the mold and the tubes joined by the lug. In either case, the mold may be formed such that the  
lug tapers towards the tubes.